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ABSTRACT

This is a guide to the nature, purpose, and potential uses of 13 course goal collections produced by the K-12 Goal Development Project through the cooperative efforts of the school districts and intermediate education districts of three counties in the metropolitan Portland, Oregon, area. The project has as its initial objective the production of collections of educational goals (learning outcomes) for use in managing and planning at all school system levels and the labeling of these goals with codes that make their curricular uses apparent and permit their retrieval in various combinations from a computerized storage system. To date, these collections have been produced in the following subject areas: art, biological and physical sciences, business education, computer education, health education, home economics, industrial education, language arts, mathematics, music, physical education, second language, social science, and career education. Three major goal types have been identified and coded in the collections--knowledge, process, and value. Of the four levels of goals--system, program, course, and instructional--only program and course levels are of immediate concern. These goal collections are designed for eight uses, including making decisions about what the schools should teach, planning cross-disciplinary instruction, and establishing accountability. (Author/IRT)

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INTRODUCTION

TO

K-12 COURSE GOALS

FOR

EDUCATIONAL PLANNING AND EVALUATION

by

Victor W. Doherty

and

Linda B. Peters

K-12 Goal Development Project

INTRODUCTION TO COURSE GOALS
FOR EDUCATIONAL PLANNING AND EVALUATION, K-12

Produced by the K-12 Goal Development Project
Multnomah County Education Service District
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K-12 GOAL DEVELOPMENT PROJECT

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Needs to Which the Project Responds

This is a guide to the nature, purpose, and potential uses of thirteen course goal collections produced by the K-12 Goal Development Project through the cooperative efforts of school districts and intermediate education districts of three counties in the metropolitan Portland, Oregon, area.

One of the most promising and potentially useful movements to reach school districts in recent years is the statement of clearly defined learning outcomes and the development of programs and evaluation methods to support their attainment.

Despite the widespread interest in goal-based program development and evaluation, however, its alleged rewards have not materialized in most school districts due to the low level of technical support available and the lack of systematic help to teachers in defining, attaining, and evaluating their students' goals. On the contrary, such efforts have often resulted in demoralizing confusion on the part of citizens, students, and staff.

Nonetheless, the internal and external needs which led to the birth of the movement persist and continue to grow. Educators increasingly recognize the usefulness of measurable learning goals in planning and evaluation and for communicating about ends of education in rapidly changing educational systems. At least 19 state legislatures and numerous boards of education have mandated the development of goal-based planning and evaluation systems to satisfy the public's increasing demand to know what is happening in the schools before they will approve and support their educational programs.

A research and development project aimed at meeting such needs is in its tenth year in the metropolitan Portland, Oregon, area. In 1971, 55 school districts joined together to create a system for defining measurable learning outcomes and to align the instructional and accountability systems of the participating districts. By combining and sharing resources, these districts

have sustained continuous development resulting in products of ever increasing scope and quality. The Oregon and Washington State Boards of Education joined in the effort in order to bring these products to all school districts in the Pacific Northwest.

This Project has as its initial objective the production of collections of educational goals (learning outcomes) for use in managing and planning at all school system levels, and the labeling of these goals with codes which make their curricular uses apparent and permit their retrieval in various combinations from a computerized storage system. To date, collections have been produced in the following subject areas: Art, Biological and Physical Sciences, Business Education, Computer Education, Health Education, Home Economics, Industrial Education, Langauge Arts, Mathematics, Music, Physical Education, Second Language, Social Science, and Career Education, K-12.

The long-range purpose of these collections is to bring consistency to the way school districts develop and select goals for instructional planning and evaluation. It provides a wide range of learning alternatives for the consideration of school planners seeking to answer the questions, "What is to be learned?" and "Has it been learned?" Thus, while the Project is initially occupied with the production and coding of "program" and "course" goals (over 20,000 have been produced and coded to date), it is also concerned in the long run with the ways these goals are attained and measured.

The goal collections are designed for these uses:

1. Making decisions about what the schools should teach.
2. Writing individual educational prescriptions.
3. Planning cross-disciplinary instruction.
4. Establishing accountability.
5. Planning regular and experimental programs and special projects.
6. Evaluating effectiveness of regular and experimental instruction.
7. Teacher education in goal-based planning and instruction.
8. Development of scope and sequence for a subject field.

Making Decisions About What the Schools Should Teach

In the growing movement to involve students, parents, teachers, school board members and local citizens in determining school system goals, it is necessary that the nature of educational goals be better understood, and that the roles of all groups pressing for greater participation also be understood within the context of the legal responsibilities of state and local boards of education. By providing a rationale and a broad range of alternatives for selecting goal statements for use at various levels of participation, it is hoped that the Project will provide an important resource for improving the effectiveness of groups involved in this type of decision-making.

Individualization of Instruction

The desire to treat students as individuals in diagnosing and meeting learning needs is a long-standing interest of educators, but one that has been frustrated by the organizational and economic constraints under which schools operate. With the advent of the computer and the development of teaching systems based upon carefully defined and detailed sequences of instructional objectives, hope rose anew for individualization of instruction. Such systems have not succeeded as expected, however, since they have gained little or nothing in economy of individual learning while sacrificing the adaptive and flexible support teachers can provide a class of learners.

The goal collections of the Tri-County Project are not an attempt to create a system for individualizing learning. Instead, they present a wide range of learning options on the assumption that the best starting point in planning any instruction, group or individual, is to clarify the learning to be attempted.

Cross-disciplinary Education

There is probably no concept in education currently more abused than "interdisciplinary education." The goals of subject matter learning at least

can be inferred from the textbooks and other materials used by teachers, but the goals of interdisciplinary education are frequently vague and ill-defined. The K-12 Goal Project, by developing extensive coding and retrieval systems, permits selection of goals in various combinations of subject matter, grade level, types of knowledge and process, subject matter and career education program goals, transdisciplinary concepts and values, and index words. This coding provides important cues for interdisciplinary planning. The goals of these collections, although organized by disciplines such as science, social studies, mathematics, music, etc., may be related and grouped through computer retrieval by specifying one or more of the seven code parameters. Thus, for example, a teacher interested in teaching a unit on ecology is able to request from these files goals dealing with related concepts in science, social science, art, language arts, mathematics, or any other subject field. A detailed discussion of the seven coding systems which facilitate this interdisciplinary use is provided in the section on "How to Read and Interpret the Materials in the Goal Collections" (page 27).

Accountability

Perhaps the greatest need addressed by the Project is for a sound basis for accountability in education. Accountability has been vastly oversimplified in the minds of most who have become interested in the concept. Most seem to regard accountability as a simple, straight-line relationship between the worker and his superior. The fact is that accountability in education extends in many directions. It has horizontal elements of management, support, and instruction, and vertical elements of federal, state, intermediate, local systems, and schools. It is the assumption of this project that goal defining, for purposes of accountability, must begin at the school system level and must undergo elaboration at the program (science, social science, etc.), course (biology, bookkeeping, or a mini-course), and finally the classroom or teacher levels.

If systems such as planning-programming-budgeting or even general concepts such as management by objectives are ever to reach the point where costs and benefits can be related in any meaningful way, it is essential to have logically consistent operational definitions of educational goals and ways to generate and relate them from level to level in a school system. The K-12 Goal Project provides such a system of definitions and the tools required to make them operational.

Another use of the collection is to provide a basis for teaching-learning evaluation and accountability. This use requires development of procedures within a school system for making a commitment to learning outcomes at the program and course levels. The goals of this collection provide a wide range of clearly stated goals from which choices can be made. Once a commitment is made (a process that may involve boards of education, administrators, teachers, students, and citizens), the educational mission of the system and of each teacher will be known and can be communicated. Methods of instruction and evaluation best suited to the goals agreed on can then be found. Under no circumstances, however, should goals stated for planning and communication be misused to limit the teacher's freedom to respond to spontaneous opportunities for learning, or to evaluate teacher performance in terms of student performance.

If a rational system is established for identifying educational goals and monitoring their achievement, attention can be turned to other questions of accountability such as the quality of services that support instruction.

Long-range Planning and Educational Development

If the events of the past few years have proved anything, it is that the potential benefits of educational experimentation and development are not being fully realized. In view of the millions of dollars that have been poured into educational development in universities and public school systems, this is a discouraging realization. However, it seems evident that without clear,

unambiguous, and consistent statements of desired learning outcomes, the ability of school systems to determine the effectiveness of various innovations does not exist. The K-12 Project has attempted to establish a set of goals so comprehensive that almost any desired learning is represented within that set. To insure this, the set is kept open and is periodically revised as suggestions accumulate from teachers or curriculum planners who have used the volumes. Any statement that is admitted to the collection undergoes a rigorous process of statement, definition, and coding to insure that its utility to teachers is equal to goals already in the collection.

Evaluating Effectiveness of Regular and Experimental Instruction

The course goal collections provide a resource for school districts to improve the quality of their research and evaluation. By identifying goals for conventional learning areas like reading and mathematics that are accepted as valid for the entire system, methodologies can be varied as desired to secure better achievement of the same goals. With common goals it is also possible to use common measuring instruments, selected for their conformity to the goals selected. This insures greater measurement validity and eliminates problems of interpretation that always arise where goals vary in some degree from program to program.

Basic to evaluation of regular instructional programs is the importance of well defined goals in all areas of instruction in a school system. This permits evaluation not only of an experimental program, but attendant effects on programs affected by a trade-off of resources made to provide the experimental program.

The thirteen volumes of the K-12 Goal Collections give comprehensive coverage of curricular areas that assists school districts in developing goals and evaluation programs for almost every educational program offered in the public schools.

Teacher Education

"Competency based teacher education" is performance oriented. It is concerned with developing specific skills and knowledge useful and necessary in good teaching. Among the important skills a teacher in training can acquire is the ability to select appropriate educational goals, formulate plans for their attainment, and evaluate student progress in terms of goals. The K-12 Goal Collections provide an ideal resource for helping prospective and regular teachers to acquire these skills. The coding of goals in terms of values, concepts, and the various subcategories of knowledge and process permits use of sophisticated planning methods to insure balance among types of learning represented in an instructional plan, experimentation with interdisciplinary planning, and examination of learning rationales.

Diagnostic-Prescriptive Instruction and IEPs

There is intense activity on the part of publishers and educators to produce diagnostic-prescriptive learning systems for use in classrooms. Criterion-referenced tests are a part of this movement aimed at providing teachers and students more clearly-defined relationships between goals, learning experiences, and evaluations. The K-12 Goal Collections provide a resource for developing diagnostic-prescriptive mastery learning approaches, both programmed and teacher managed. It should be pointed out, however, that goals in these collections are purposely defined at levels of generality that are suited to the planning of courses, and in most cases, would require reduction to more specific levels of definition to serve effectively in instructional diagnosis and prescription.

The level of generality of these goals is well suited for use in the preparation of Individual Educational Prescriptions (IEP) required in special education planning. Recently, revised collections (math, art, and language arts) include developmental goals especially useful for this purpose.

Tri-County Base of Participation and Support

Although the idea for the Project originated in the Evaluation Department of the Portland Public Schools and the first work of defining program goals was done there, it was evident that to launch upon the larger undertakings just described would involve a degree a financial and personnel support that could not be achieved with Portland's resources alone. Involvement of all districts in a three-county area appeared to be the most logical way to secure the needed financial and personnel resources. This proved feasible because of the relatively dense and compact population of the region. Three intermediate education district offices provided leadership and services, and the excellent teaching staffs of the urban and suburban school districts offered a fine resource for staffing the numerous committees required for the work.

Careful measures were taken to secure highly qualified teachers for writing the goals of the collections. Inservice training sessions were given in writing goals of the type desired. These were held prior to the goal-writing workshops, and teachers worked under the close supervision of subject matter specialists and project personnel. One of the major benefits to participating districts has been the training in goal-based planning their teachers received which has enabled them to assume leadership roles in their districts.

Goals written by teachers were edited by a scholar-editor and reviewed by subject-matter specialists at both the public school and university levels.

In the first year, support came from the budgets of the Portland school district, the three intermediate education districts, a small grant from the Regional USOE Office, and a small grant from the Oregon Board of Education. In the second year, these sources of funding were continued, but in addition, school districts throughout the Tri-County area supported teachers who were selected for participation in the Project. In the third year, increased support from the State Education Departments of Oregon and Washington supplemented that

of local and intermediate education districts. The budget in more recent years has included revenues from book sales, all of which have been re-invested in the Project, and a budget of approximately $100,000 has been sustained over the past several years through a combination of revenue sources named above.

Content and Form of the Goals

Types of Goals

Three major goal types have been identified and coded in the collections: knowledge, process, and value. These form the basis for a set of subtypes as described below.

Knowledge and process goals.

Goals are classified as knowledge or process depending upon whether they deal with something that is to be known or something the student is able to do. These goals, therefore, begin with the words, "The student knows ..." or "The student is able to ..."

Through its knowledge and process goals, the Tri-County Project offers learning outcomes of both the traditional reception/content-mastery type and the increasingly important information processing type. The increasing need for the latter type of goal is supported by the following observations: (1) Comprehensive mastery of the facts in most fields is doubling in less than ten years. By the time one knows "the facts" a new set has emerged. (2) "Established" facts change, causing many fact-bound curricula to become obsolete during the approximately five-year lag between their conception and their widespread dissemination. (3) Social mobility and cultural pluralism make it increasingly difficult to identify the "important" facts. (4) Rapid social change makes it increasingly difficult to use the needs of students as criteria for selecting important facts, since future needs may be different from today's needs.

The influence of these factors is more or less according to the nature of the discipline. The "facts" about the structure of the natural number system in mathematics are not subject to change. The "facts" about the state of development of treatments for cancer in health are open to rapid evolution. In all discipline fields, however, for a given teacher, group of students, and situation there is a combination of facts to be remembered and processes to be learned. By offering many knowledge and process learning outcome alternatives, the Tri-County Project provides a resource for finding the desired combination both for groups and for individual learners.

Twelve categories of knowledge have been used in classifying the course goals. And over seventy inquiry problem-solving processes have been identified under the following headings: acquiring information, validating information, organizing information, interpreting information, using information to provide new information, acting upon the basis of information, and communicating information.

The knowledge and inquiry problem-solving processes are represented in Tables A and B following. It will be noted that these classifications owe a partial debt to earlier researchers--notably Benjamin Bloom, David Krathwohl, Robert Glaser, Henry Walbesser, and Ralph Tyler in Education; Robert Gagne and Robert Miller in Psychology; Jean Piaget and Jerome Bruner in Child Development; and others. Major differences appear, however, in the manner in which the categories are organized and in their content. This is in large part due to validation and revision resulting from testing the adequacy of original a priori categories in classifying 20,000 goals from a variety of areas. Notice, for example, that the knowledge categories do not deal with knowledge of generalizations as a content category (as in Bloom), but rather assume that any goal representing a generalization must also deal with one or more of the content categories. Generalizations as a class of knowledge are therefore given superordinate status and divided into two classes: principles and laws, and

simple generalizations. Also, notice there is no category of knowledge of specific facts (as in Bloom), for most of the goals under each of the basic content categories are stated as facts. New categories not found in Bloom include knowledge of properties, parts, characteristics, features, elements, dimensions; knowledge of contexts, locations, orientations; knowledge of operations, methods, functions; knowledge of causes and effects including costs and benefits; and knowledge of relationships that are non cause-effect.

Perhaps the most significant departures from Bloom concern the process categories under problem solving and inquiry. First, the entire taxonomy is intended to represent standardized or conventional processes of problem solving and inquiry that can be taught and learned, rather than psychological processes. This difference is important to teachers who have found it difficult to deal with learning goals within the context of Bloom's taxonomy, because it is not clear how psychological processes can be improved through instruction.

Table A

Knowledge Categories

G1	Principles and Laws
G2	Simple Generalizations
K1	Conventions: Names and Nomenclature
K2	Conventions: Symbols, Rules, Standardized Processes, Definitions
K3	Properties, Parts, Characteristics, Features, Elements, Dimensions
K4	Trends and Sequences
K5	Similarities and Differences, Discriminations, Classifications
K6	Contexts, Locations, and Orientations
K7	Operations, Methods of Dealing with, Functions
K8	Cause and Effect Relationships
K9	Criteria or Standards
K10	Non Cause-Effect Relationships

Table B

Inquiry Problem-Solving Processes

P1 Input — Acquiring Information

- P11 Viewing
- P12 Hearing
- P13 Feeling (tactile)
- P14 Smelling
- P15 Tasting
- P16 Using sense extenders
- P17 Using internal sensors of emotion

P2 Input Verification — Insuring Validity and Adequacy

- P21 Evaluating authoritativeness of sources
- P22 Evaluating logical consistency and accuracy
- P23 Evaluating relevance to desired learning purposes
- P24 Evaluating adequacy for acting or deciding (comprehensiveness and depth)

P3 Preprocessing — Organizing Information

- P31 Labeling, naming, numbering, coding
- P32 Recording, listing
- P33 Classifying, categorizing, grouping, selecting according to criteria
- P34 Ordering, sequencing
- P35 Manipulating, arranging, transforming, computing
- P36 Estimating
- P37 Summarizing, abstracting

P4 Processing I — Interpreting Information (drawing meaning from data)

- P41 Decoding verbal and nonverbal symbols (reading and literal translating)
- P42 Inferring, interpolating, extrapolating
- P43 Analyzing
- P44 Associating, relating, equating
- P45 Comparing, contrasting, discriminating
- P46 Synthesizing
- P47 Testing against standards or criteria
- P48 Generalizing

P5 Processing II — Using Information to Produce New Information

- P51 Theorizing, predicting
- P52 Formulating hypotheses
- P53 Testing hypotheses
- P54 Revising hypotheses

P6 Output I — Acting on the Basis of Information

- P61 Reacting
- P62 Making decisions
- P63 Solving problems
- P64 Restructuring values (adapting, modifying)
- P65 Restructuring behavior (adapting, modifying)
- P66 Encoding verbal and nonverbal symbols prior to communication
- P67 Creating on the basis of knowledge and process

P7 Output II — Communicating Information

- P71 Vocalizing (nonverbal)
- P72 Gesturing, moving
- P73 Touching
- P74 Speaking
- P75 Writing
- P76 Using art media (painting, drawing, sculpting, constructing, etc.)
- P77 Dramatizing
- P78 Singing, playing instruments
- P79 Dancing

The Project has attempted to define process learnings that can be taught within the respective categories. Some processes are specific to particular fields of inquiry, and some, such as the formulation of hypotheses and the statement of sound generalizations, are applicable in any field of inquiry. In the revised science and social studies collections, both types of process are represented, and distinctions have been made between those that are specific to disciplines and those that are of universal character.

Value goals. In the ten most recently revised or produced collections (science, social studies, mathematics, language arts, art, industrial education, home economics, business education, computer education, and second language) explicit value goals have been made a part of the collections. Similar goals will be added as the other collections are revised. Value goals of two types are included: (1) those relating to processes of value clarification, and (2) those representing value choices that might be fostered in the context of the discipline. The latter type includes values relating to societal conditions that support the maintenance of disciplines or fields of study, values relating

to elements or processes of the discipline esteemed by its experts, and values relating to the satisfaction of human needs which a study of the discipline provides.

Value clarification goals are concerned with such matters as ability to understand the cognitive and emotional bases that underlie personal and social behaviors; the informational basis of beliefs, opinions, and judgments; and ability to develop and apply logical criteria for making judgments and taking action.

Social problems and issues provide an important medium for clarifying values, and sets of issues useful for this purpose are included in the science and social science collections as appendices.

In addition to the values goals included in the collections, a Taxonomy of Values is included in the recently published volumes along with the process and knowledge taxonomies shown above. This taxomony is reproduced here as Table C. Any knowledge or process goal in the collection that has, in its learning, the potential for enhancing or developing a value, is coded to that value in this taxomony.

Table C

Values Taxonomy

VI. Environment - Related Values

VI.1 Qualities of environment

Complexity

Diversity

Order (regularity)

Unity

VI.2 Coping with environment: activities

Exploring

Inquiring

Modifying

Adapting

Predicting

Planning

V1.3 Coping with environment: modes

Fantasy

Logic

Research

Experimentation

Prayer

Mysticism

Invention

V1.4 Using environmental resources

Knowledge of resources

Access to resources

Maintenance of resources

Preservation of resources

V1.5 Representing the environment

V1.5.1 Forms of representation

Images

Symbols

Models

V1.5.2 Qualities of objective representations

Clarity

Accuracy

Logical consistency

Relevance

Comprehensiveness

Predictive validity

Adequacy as basis for action or decision

V1.5.3 Qualities of artistic representations

Technique

Form

Harmony

Dissonance

Symmetry

Rhythm

Grace

Style

Eloquence

Integrity

Individuality

V2. Society and Culture: Related Values

V2.1 Social ideals

Justice

Democratic process

Rule of law

Equality

Freedom

Brotherhood

Social morality

Social responsibility

Peace

Productivity

Security

Unity of purpose

Pluralism

Stability

Progress

Honor

Literacy

V2.2 Social processes

Working

Communicating

Assembling

Participating

Sharing

Cooperating

Competing

Educating

Problem solving

Planning

Policy making

V2.3 Social rights

Freedom of speech

Freedom of assembly

Freedom of inquiry

Voting

Dissenting

Assenting

Privacy

Ownership of property

Equal protection under law

V2.4 Social institutions

Family

Schools

Government

Religious institutions

V2.5 Social regulators

Mores

Laws

Policies

Regulations (rules)

V2.6 Cultural heritage (social conventions)

Language

Tools

Cultural arts

Cultural beliefs

Cultural knowledge

Cultural skills

V3. Personal Functioning: Related Values

V3.1 Qualities that contribute to personal effectiveness

Curiosity

Rationality

Resourcefulness

Perseverence

Innovativeness

Initiative

Ingenuity

Imaginativeness

Creativity

Commitment

Adaptability - flexibility

Judgment

Health

Insight

Knowledgeability

Responsibleness

Efficiency

Craftsmanship

Self-discipline

Openness

Aesthetic responsiveness

V3.2 Qualities that enhance personal and social relationships

Tolerance

Appreciativeness

Trust

Thoughtfulness

Sensitivity

Respectfulness

Compassion

Love

Individuality

Humility

Dignity

Faithfulness

Empathy

Courage

Integrity

Humor

Morality

Cooperativeness

Social concern

Social sensitivity

Friendliness

Honesty

V3.3 Conditions of self-esteem and self-actualization

Personal growth and development

Competence

Self-knowledge

Self-confidence

Self-respect

Self-reliance

Self-direction

Self-expression

Self-fulfillment

V3.4 Self-actualizing responses to environment

Curiosity

Concern

Respect for life

Wonder

Reverence

Awe

Satisfaction

Enjoyment

There are many reasons for this attempt to deal seriously with the question of learning outcomes in the area of values and attitudes. It is, for instance, becoming increasingly clear that exclusive concern for knowledge and process can be a very sterile approach to learning that can leave learners with seriously incomplete impressions, as well as negative attitudes toward learning. Moreover, at this point in history, national events are revealing

the serious implications of having in sensitive and creative positions of trust individuals who are knowledgeable and able, but who lack perspective, ethics, personal integrity and responsibility. In a practical sense, if learning is to be effective, it must involve the student in personal, value- laden interactions with information being encountered and processed.

Instructional planning based upon value goals differs in important ways from planning for knowledge and process goals. Values are acquired both from the class and school environment and from the "content" of instruction. Students acquire values through the information they encounter and through the manner in which they process that information. To help students acquire and clarify values, teachers must help them learn to verify information, relate information to criteria and standards, and to compare and contrast the value positions that cause people to take different positions on public and private issues.

Because values education is an emerging field in which creative thought is very much needed, reactions of readers to the values sections of each goal collection are especially solicited. This is in accord with the Project's policy of seeking feedback to assist in improving and revising these volumes.

Levels of Generality of Goals Chosen for Development - Program and Course

In public K-12 education there are many levels of interest, resource allocations, and activities. These include: national, state, local, school, classroom, and individual students. A goal statement which is appropriate to the planning requirements of a state school system will not be useful in helping an individual child move forward on a given day.

Four levels of goals will be discussed here. These are system, program, course, and instructional. For reasons explained later, only the program and course levels are the immediate concern of this Project.

Boards of education are responsible for approving statements of purpose at the system level. These statements generally reflect the expectations of the community and the larger societies of the state and nation regarding the kinds of learning that should result from school experience.

System level goals:

A. Are sufficiently general to encompass all outcomes within relatively few statements.

B. Are expressed in terms of learnings serving the dual needs of the individual and society.

C. Provide clear direction to program planners in establishing programs and defining curricular goals.

D. Are measurable in terms of broad indicators.

They are employed mainly to inform the citizenry of the general aims of the schools and to elicit their financial and political support.

Examples of system goals are:

> Every child respects the rights of every other child regarding his possessions, his physical safety, and the free expression of his ideas.
>
> Every child is able to read and to comprehend what is read within unavoidable constraints of ability and physical and mental health.
>
> Every child is able to set goals for himself, formulate plans for attaining them, execute his plans, and evaluate his efforts.
>
> Every child attains that level of self-confidence and confidence in others required for personal and social effectiveness.
>
> Every child possesses sufficient knowledge of the facts and principles of science, technology, government, and human relations to make effective decisions as a person and as a member of society.
>
> Every child is able to communicate with others, both orally and in writing, in a manner that satisfies his own need for expression and the requirements of those under whom he may become employed or receive further education.
>
> Every child is able to make effective use of the resources of the school and community in pursuing his learning interests.

Every child is able to make effective use of the resources of the school and community in pursuing his learning interests.

A second level goal is required to elaborate the meaning of each district goal, and to move from the political to the educational domain. Such program goals should be sufficiently comprehensive to provide for the full implementation of all district goals, and should provide the basis for formulating goals of courses and other units of educational experience. Program goals may be chosen and formulated by curriculum specialists at the district, area, or even school level using the K-12 Goal Project program goals as a resource. From 8 to 30 program goals have been produced in each of the thirteen subject areas addressed thus far by the Project. Program level goals are used as a basis for defining the outcomes of an entire area of instruction such as mathematics, language arts, or health education.

Examples of program level goals are:

> Students are able to spell all words enjoying common usage in the English language.
>
> Students are able to employ elements of structure of the English language appropriately in their oral and written expression.
>
> Students are able to employ the conventions of punctuation appropriately in written expression.
>
> Students are able to locate appropriate references in doing research, to document such references according to common conventions, and to employ the findings appropriately in support of a conclusion.
>
> Students are able to reach conclusions based on the weighing of relevant facts and authoritative opinion, and to alter conclusions where new evidence indicates this should be done.

The second level of specification should be sufficiently general as not to suggest specific grade placement, but as had been stated, specific enough to provide a sound basis for generating the subgoals of the courses and other units of educational experience that will comprise the program.

The third level of goal specification (course goals) provides the basis for organizing instruction within schools to accomplish program goals. In this process, program goals must undergo both an elaboration of detail and a

differentiation in terms of learning levels. Typically, these will be the learning goals of courses (high school and departmentalized elementary schools) and areas of instruction (nondepartmentalized elementary schools). These goals may be selected or formulated using the K-12 Course Goals as a resource. From 750 to 4500 course goals have been produced in each of the thirteen subject-matter areas.

Examples of course goals taken from the music collection are:

> The student is able to identify, describe, and distinguish among rhythmic features in music.
>
> The student is able to construct a metric system for music.
>
> The student is able to associate meter in music with meter signature and conducting patterns.
>
> The student is able to devise a system for notating sound durations.
>
> The student knows the conventions of notation by which music is represented (e.g., accents, main beats, bar lines, subdivisions of beats, time signature, notes and rests, ties).

It is the prerogative and responsibility of the teacher and only the teacher to elaborate from level 3 to level 4, the instructional goal level. It is the teacher who must create instructional methods appropriate to carry out the planning done with course goals in such a way as to satisfy the particular needs of children in a given class or school. The essence of teaching is combining understanding of desired outcomes with a perceptive adaptation of methods to help children of many conditions achieve those outcomes. A well-trained teacher who is provided a set of course goals should be able to translate them into more specific instructional goals, and to select appropriate methods of achieving them.

In Figure 1 an example from science is provided to further clarify the different goal levels, and also to illustrate how they differ from behavioral and performance objectives.

Figure 1

PLANNING	System goal:	The student is able to apply basic scientific and technological processes.	
	Program goal:	The student is able to use the conventional language, instruments, and operations of science.	To be found in the course goal collections.
	Course goal:	The student is able to classify organisms according to their conventional taxonomic categories from observations, illustrations or descriptions.	
	Instructional goal:	The student is able correctly to classify as needleleaf, cuttings of the following trees: hemlocks, pines, spruces, firs, larches, cypresses, redwoods, and cedars.	
MEASUREMENT	Behavioral objective:	Given cuttings of ten trees, seven of which are needleleaf, the student is able correctly to identify which of the trees are needleleaves.	Not integral part of this Project's system of goal-based planning.
	Performance objective:	Given cuttings of ten trees, seven of which are needleleaf, the student is able correctly to identify at least six of the seven as belonging to the class of needleleaves.	

Writing the Goals

Program level goals were written by curriculum specialists and the editor. Criteria used in writing program goals are given in Figure 2.

Figure 2

Program Goal Criteria

1. Is the goal an important learning in the opinion of the public, the professional educator, and the student?
2. Is the meaning of the goal clear and concise?
   a. Is its meaning apparent to the general public?
   b. Do the words used have a common dictionary meaning?
   c. Is it parallel in construction with the other goals in the statement?

d. Is the form consistent?

e. Is it brief and to the point?

3. Is the goal expressed as a learning outcome?

   a. Does it identify the outcome of the learning rather than the method used to attain it?

   b. Can one identify what the student will be able to do, know, or value?

   c. Are the limits of the desired outcome clear?

4. Is the goal readily subdivided into goals suitable for course planning?

   a. Is the meaning of the goal so clear that its component meanings are readily derived from it?

   b. Can subpoints be generated which adequately represent the total meaning of the program goal?

5. Is the goal an important learning in terms of the needs of society and the learner?

6. Does the totality of program goals provide a comprehensive description of all learnings in the program?

The criteria used to guide writers in producing course goals are given in Figure 3. The course goals were written by teachers, curriculum specialists, university consultants, and the editor. Goals initially were in all cases subjected to critical review by curriculum specialists and university consultants.

Figure 3

Course Goal Criteria

1. Is the educational outcome stated potentially significant?

2. Does the goal begin with "The student knows..." if it is a knowledge goal and "The student is able to..." if it is a process goal?

3. Is the goal stated in language that is sufficiently clear, concise, and appropriate? (Can it be stated in simpler language and/or fewer words?)

4. Can learning experiences be thought of that would lead to the goal's achievement?

5. Do curricular options exist for the goal's achievement? (Methodology should not be a part of the learning outcome statement.)

6. Does the goal clearly contribute to the attainment of one or more of the program goals in its subject area?

7. Can the goal be identified with an approximate level of student development?

8. Can criteria for evaluating the goal be identified?

In the next section of this report are explained the coding systems that have been developed to make the K-12 Goal Collections useful to clients.

How to Read and Interpret the Materials in the Goal Collections

Following the introduction in each volume there are colored sections denoting four sets of indexes for retrieving course goals: yellow--knowledge, process, and values classifications; blue--program goals; green--career education program goals; and pink--subject matter taxonomy.

Numbers and/or letter codes on the course goals refer to the materials on the colored pages. Below is a description of how to read and interpret a page of course goals and its codes. A sample page from the science collection is shown in Figure 4.

Subject Matter Taxonomy Headings

A sample page from the science subject matter taxonomy is shown in Figure 5. This sample includes the heading for the goals shown in Figure 4. The taxonomies of the thirteen subject areas were written by curriculum experts and the editor as frameworks for organizing the goals in the collection, and were revised as information emerged from the inquiry and writing process. By looking through the taxonomy at the front of any one of the collections, a user can find what topics are covered and turn to the topic in which he or she is interested. Also, a taxonomy heading may be used along with one or more of the other codes to retrieve desired sets of goals from the computerized system.

FIGURE 4
SCIENCE

6. Earth and space sciences
6.2 Meteorology
6.2.4 Moisture

COURSE GOALS	Level D/P/I/U/H	Knowledge, Process or Value Classification (See Yellow Section)	Subject Area Program Goals (See Blue Sec.)	Career Ed. Program Goals (See Green Sec.)	Other Related Content Taxonomy Headings	(C) Concept/ (V) Value Words
6.2.4.2. Water cycle (See also 4.2 States of matter)						
1. The student knows that water evaporation is the changing of water into a gas called water vapor.	P I	K1 K2		3 4		
2. The student knows that the rate of evaporation is dependent on temperature and humidity.	P I U	K8		4		
3. The student knows that condensation is the change of a gas to a liquid.	P I	K1 K2		3 4		
4. The student knows that condensation of water depends on temperature and pressure.	P I U	K8		4		
5. The student knows that precipitation is any or all forms of water that fall from the atmosphere to the earth.	P I	K1 K2		3 4		
6. The student knows the progression of the water cycle (e.g., evaporation of water from the ocean, transported as water vapor over the land, condensation, precipitation on land, run off from land to ocean and continuing in that pattern).	P I U	K4		4	6.3.5.2 3.4.3.2	

FIGURE 5

		Page
6.2	Meteorology	636
	6.2.1 History of meteorology	637
	6.2.2 Origin and structure of atmosphere	638
	6.2.3 Heating and cooling (see also 5.9)	642
	6.2.4 Moisture	645
	6.2.4.1 Humidity	646
	6.2.4.2 Water cycle (see also 4.2)	647
	6.2.4.3 Clouds and fog	648
	6.2.4.4 Precipitation	649
	6.2.5 Storms	650
	6.2.5.1 Air masses and fronts	651
	6.2.5.2 Violent storms	652
	6.2.6 Winds	653
	6.2.7 Climate	655
	6.2.8 Weather Forecasting	656
	6.2.9 Weather Control	657
6.3	Geology	663
	6.3.1 History of geological sciences	663
	6.3.2 Earth's structure (physical geology)	665
	6.3.2.1 Interior	666
	6.3.2.2 Crust	667
	6.3.2.3 Surface features	668
	6.3.2.4 Minerals	670
	6.3.2.5 Rocks	674
	6.3.2.6 Soils (see also 6.3.5.1)	681
	6.3.3 Geologic processes (physical geology)	683

Course Goals

In the far left column of Figure 4 under the heading "6.2.4.2 Water Cycle" are the course goals themselves. Some goals in this column may have a bracket to their left. The goals inside the bracket are logically related and may be viewed as a unit (there are no bracketed goals in this example).

Level D/P/I/U/H

This code provides an estimate of the level or levels at which the learning is appropriate. Here appropriate level has been interpreted as "grade" level with "D" referring to developmental or pre-primary, "P" referring to K-3, "I" to 4-6, "U" to 7-8, and "H" to 9-12. In four of the collections where the formal instruction is concentrated in high school (i.e., business education, home economics, industrial education, and second language), it was decided to interpret level as level of "skill," not "grade." Thus, D/P/I/U/H refers to five possible levels of skill attainment independent of grade location. The meaning of level in each collection is discussed in its introduction. Many times the nature of the goal suggests continued learning over several levels, in which case all levels involved are coded. These levels are approximate, for it is evident that the appropriate time for learning varies with the interests and abilities of students and the organization of the school.

Knowledge, Process, and Value Classification Systems

The classifications referred to are described at the front of the book on the yellow pages. All goals are roughly classified as knowledge, process, or values, depending upon whether they deal with something that the student is able to recall, something the student is able to do, or something the student might value. All goals therefore begin with the words, "The student knows..." or "The student is able to..." or "The student values..."

The familiar knowledge/process/values distinctions are further subdivided into twelve knowledge (e.g., K8), numerous process (e.g., P45) and numerous values (e.g., V5) categories to which all course goals have been coded. The values goals in the more recent collections have been coded to broad values classification headings (e.g., V3), referenced to the recently added values taxonomy. In earlier collections, such grades are simple coded "V." These three taxonomies (K-P-V) appear on pages 14-20 of this Introduction.

Subject Area Program Goals

In this column we find the number of one or more of the program goals found on the blue pages in the front of each course goal volume. This type of goal was discussed earlier. Here it is enough to recall that program goals are more general than course goals, and that a set of program goals should constitute a description of the major learning outcomes expected from a program. Each course goal is cross-coded to the program goals(s) to which it is most directly related.

Career Education Program Goals

In this column we may find the code of one or more of the career education program goals found on the green pages in the front of each course goal volume. These goals are broad in scope, and nearly every course goal bears at least an indirect relationship to such career education goals. Only those course goals, however, which have a "direct" relationship to a stated career education program goal were coded to that goal.

A "direct" relationship was interpreted to exist if a teacher could easily and naturally attach some career meaning to the instruction relating to that course goal, and thus integrate the teaching of career education into the teaching of his subject. The restriction of the codings to such direct

relationships resulted in few codings being assigned in some parts of the collections.

Recent collections (and several of the earlier ones also) have a section concerning careers related to the field of study. As revisions occur, such a section will be added to those collections not having one. In this section are included knowledge goals relating to careers in science, social science, or whatever field the collection represents.

The career education code used makes the collections a useful resource for "integrating career education and the rest of the curricula."

Other Related Content Taxonomy Headings

This code is provided since goals are often correctly classified under more than one subject heading. The numbers in this column also refer to the subject-matter taxonomy on the pink pages at the front of each course goal volume.

(C) Concept / (V) Value Words

The final right-hand column is used to relate goals to the particular values and organizing concepts which they may help to clarify or develop. In the Social Studies Collection, the concept words (C) are taken from a list appearing in the Appendix (p. 731). The list was prepared after review of a wide range of curriculum materials for concepts to be represented. In that collection, each concept word also appears as an index entry, marked with an asterisk (*); all goals in the collection which are coded to it are entered beneath by page and goal number. Thus the index may be used to retrieve goals by concept, as well as by subject, for interdisciplinary and/or concept-based planning.

The value words (V) are taken from the Value Taxonomy discussed above in those recent collections having this Taxonomy.

The association of a value or concept word with a knowledge or process goal usually signals an opportunity to teach information or skills in ways that tie them to a particular concept or value orientation.

Index

A final code is the Index Word. The index to the course goals is found at the back of each book. It supplements the subject taxonomy (pink pages) as a way of locating information in the collections.

By-Products of the Project

One of the major side effects of the K-12 Goal Project is the development of training materials for objective-based educational planning and the evolution of a corps of teachers familiar with the concept of goal-based planning. In over nine years, extensive training was undergone by the more than 400 developers and support personnel, in the course of which the assumptions, definitions, and procedures of the Project were refined and extended.

Validation of the Goals

All course goal collections are first released as critique editions for circulation to teacher and curriculum specialists. After a period of use, and based on feedback from users, a second (revised) edition is issued. Second editions have been issued in Language Arts, Biological and Physical Science, Social Science, Mathematics, and Art.

An important step in validating the content of each collection is the formation of a Review and Revision Committee in each of the thirteen subject areas. Each committee includes university personnel and public school

specialists in the discipline goals. A scholar-editor supervises and assists in this process.

Continual Update and Revision

Updating and revision by the committees is continual. The course goal collections are open-ended, continually added to, deleted from, and revised to make them better reflect the range of learning outcomes any teacher might strive to attain.

Measurement Implications

One of the objectives of the K-12 Goal Project is to point the way to a more rational theory and practice of educational measurement.

In the Project there have been four major steps taken toward improved measurement. The first is to define clear and measurable learning goals. The second is to develop a hierarchical goal structure that corresponds to the organizational realities of school systems. The third is to analyze and classify knowledge, process, and values learning to clarify their dimensions. This should be helpful in understanding the special measurement requirements of each type of learning.

The fourth and most important step is in the actual development of goal-based measurement programs. Extensive work is under way in the States of Oregon and Washington (Northwest Evaluation Association), the Metropolitan Portland area (Metropolitan Area Test Program Board), and the Portland Public Schools to establish pools of test items and related goals. The Rasch scaling procedure is being used to place all items in a subject pool on a single scale which, once established, permits a score estimate to be derived from any set of items drawn

from the pool. The flexibility that this procedure affords educational measurement is revolutionary. It frees users from dependence on the limiting qualities of norm-referenced data, and permits greater latitude in goal selection by schools and teachers.

Curricular Implications

A general concept of learning, and hence of curriculum design, has been envisioned in the structure and coding of the goal collections. Inquiry and problem solving processes are normally carried out within some kind of a learning context, and the interaction of these processes with the learning context produces knowledge and values. The components of this curriculum design, in terms of goals, are the various process skills that can be developed under the supervision of the teacher, and the knowledge and values outcomes that are desired.

In most instructional improvement work in the past, the attention paid to the methods and materials of instruction has overshadowed the attention given to defining worthwhile learning, probably to the detriment of both.

By reversing this emphasis and stressing knowledge of learning outcomes on the part of the teacher, it is possible to achieve these advantages: teachers can employ methodologies which they themselves are most effective in using; teachers are free to select learning experiences that are relevant to the interests of students; teachers can encourage students to find their own methodologies for achieving learning goals; and teachers and students can select learning experiences uniquely available in their own communities and neighborhoods.

Each of these points has significance when we speak of individual interests and learning styles among students, and of individual strengths and differences among teachers.

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